SUBSTITUTE SPECIFICATION

F-6817 Ser. No. 09/762,530

SELF-ADHESIVE SHEET

Field of the Invention

The invention relates to a self-adhesive sheet for bonding a floor covering to a floor.

Background of the Invention

In the prior art, self-adhesive tapes and sheets have a pressure-sensitive adhesive coating applied to both surfaces of a backing layer. Either the backing layer of the self-adhesive tapes is itself designed as backing fabric, or a fabric is applied to the backing layer in order to obtain dimensional stability.

The pressure-sensitive adhesive coating has different adhesive strengths on the two surfaces of the backing layer. The adhesive strengths of the pressure-sensitive adhesive coating are selected so that the top surface, facing the floor covering, has a higher adhesive strength than the bottom side, which faces the floor. The application rates at which the pressure-sensitive adhesive coatings are commonly used, especially on the bottom surface, are in the region of 100 g/m^2; the lowest are situated in the region of 70 g/m^2, and virtually no manufacturer uses application rates below 70 g/m^2.

The objective of providing different pressure-sensitive adhesive coatings and/or adhesive strengths is that the floor covering, a carpet for example, should on the one hand adhere well to the floor, parquet for example, and on the other hand should be releasable without residue from the floor, together with the self-adhesive tape adhering to the floor covering. In order to ensure secure adhesion both to the floor covering and to the floor during laying, the conventional self-adhesive tapes, only have a small difference in the pressure-

sensitive adhesive coating and/or in the adhesive strength of the two surfaces since they are generally not applied in a flat state. As a result, there is a risk that, if bonding to the floor is excessive, part of the pressure-sensitive adhesive will remain adhering to the floor, or that, during detachment, the self-adhesive tape will tend to part from the floor covering rather than from the floor. Accordingly, residueless detachment is not guaranteed under all conditions. It is true that the self-adhesive tapes being used include those whose adhesiveness differences are brought about on the respective surfaces by the structural differences which exist owing to the unevenness of the backing fabric, i.e., the self-adhesive tapes have a "rough" surface of lower adhesiveness and a "smoother" surface of greater adhesiveness. However, it is not possible with this design either to guarantee residueless detachment of the floor covering from the floor under all conditions, owing to the pointwise loads on the "rough" surface and the associated centers of adhesion between the self-adhesive tape and the floor.

Objects and Summary of the Invention

It is an object of the invention to provide a self-adhesive sheet which, under essentially all conditions, ensures both secure adhesion of the floor covering with the floor and residueless detachment of the floor covering from the floor, and so offers ease of handling.

The object is achieved in accordance with the invention with a self-adhesive sheet for bonding a floor covering to a floor which comprises a backing layer made in particular of polymer film, which is coated on a top surface facing the floor covering and on a bottom surface facing the floor with a pressure-sensitive adhesive coating. At least on the top surface, the backing

layer has a textile structure. The pressure-sensitive adhesive coatings have a different adhesive strength on the two surfaces. The pressure-sensitive adhesive coating and/or the adhesive strength on the bottom surface is a fraction of that on the top surface and at least on the bottom surface has a planar or substantially planar design.

The self-adhesive sheet in accordance with the invention is used to bond a floor covering, especially a carpet, to a floor, especially parquet.

The self-adhesive sheet has a suitable backing layer. Preferably, the backing layer comprises polymer film, e.g., propylene or polyethylene film, although in principle, it is also possible to use any other suitable material, such as rubber, latex, or the like.

At least on the top surface, facing the floor covering, the backing film has a fabric which serves in particular to maintain the dimensional stability of the self-adhesive sheet during laying and during detachment. The fabric may also be arranged on the bottom surface, facing the floor, or on both surfaces. The fabric is formed by threads of suitable material of tensile strength.

Detailed Description of the Invention

In a self-adhesive sheet in accordance with the invention, both surfaces of a backing layer have a pressure-sensitive adhesive coating, the pressure-sensitive adhesive coating and/or the adhesive strength on the bottom surface being only a fraction of that on the top surface. For this purpose, it is possible to use pressure-sensitive adhesives having different bond strengths on each of the two surfaces, or the same pressure-sensitive adhesive on each surface.

As the pressure-sensitive adhesive, it has been found appropriate to use an acrylic dispersion enriched with resins and with UV protection and ageing

protection contained therein, although it is also possible to use any other suitable pressure-sensitive adhesive.

The pressure-sensitive adhesive coating may be applied flatly, i.e., in a planar manner. However, a pressure-sensitive adhesive coating arranged substantially in the form of stripes on the surfaces, with adhesive-free spaces in between, is also possible. The combination of two-dimensional application and striped application on one of the surfaces, or the combination thereof on one of the surfaces, is likewise possible.

In accordance with the invention, at least the bottom surface with the significantly reduced pressure-sensitive adhesive coating may have a planar or substantially planar design. The top surface as well may have a planar or substantially planar design.

The design of the self-adhesive sheet with a fraction of the pressure-sensitive adhesive coating on the bottom surface, in view of the relatively low level of pressure-sensitive adhesive coating and/or adhesive strength, offers particularly reliable and residueless detachment of the floor covering and/or the self-adhesive sheet adhering to it. Since the self-adhesive sheet in accordance with the invention adheres securely to the floor covering because the adhesive strength on the top surface is substantially greater in comparison to the bottom surface, easy detachment of the floor covering with the self-adhesive sheet adhering to it is possible. In addition, the planar or substantially planar bottom surface of the self-adhesive sheet, in accordance with the invention, despite the relatively low level of pressure-sensitive adhesive coating and/or adhesive strength, produces secure bonding of the floor covering to a floor, especially to smooth parquet, since the bond is not simply pointwise, as in the case of self-adhesive tapes having structured bottom surfaces. In view of the planar or

substantially planar bottom surface of a self-adhesive sheet in accordance with the invention, no centers of adhesion are produced, which because of their small areas do not offer secure bonding but instead adhere pointwise more strongly to the floor. As such, the guarantee of secure bonding is supplemented by that of reliable detachment as well.

It is particularly advantageous if the self-adhesive sheet is designed so that its length and width are, in contrast to conventional self-adhesive tapes, extensively cover substantially the entire floor to be covered with the floor covering. The length is selected in accordance with the requirements of the spatial circumstances and the ease of processing. As far as the width is concerned, a range from 350 to 2000 mm is preferred for reasons of ease of processing and practicability. More preference is given to a width range of from 500 to 1500 mm, and particular preference to a range from 600 to 1000 mm. Of course, for corresponding spatial circumstances, it may be preferred to select the lengths as well to be within these ranges.

The extensive design of the self-adhesive sheet, like the planar or substantially planar shaping of the bottom surface, even though the pressure-sensitive adhesive coating and/or the adhesive strength of this surface is only a fraction of that of the top surface, offers particularly secure adhesion of the floor covering to the floor, since in this manner, a large adhesion area is obtained in contrast to conventional self-adhesive tapes.

Since it is possible to apply pressure-sensitive adhesives having different bond strengths to the surfaces, it is not solely the application rate of the adhesive that is responsible for the different adhesive strengths of the adhesive layers of a self-adhesive sheet in accordance with the invention, but also the different bond strengths of the pressure-sensitive adhesives used.

As a generally valid measurement technique for the adhesive strength of a pressure-sensitive adhesive coating, the measurement of the adhesive force in accordance with DIN 1939 is used. With this technique, a measurement is made of the force required to peel off the self-adhesive sheet, which is provided with the pressure-sensitive adhesive coating under investigation, having a defined bond strength and a defined application rate. In accordance with the test standard, the width of the self-adhesive sheet is 25 mm and its bond partner is a steel surface.

In accordance with the invention, preference is given to an adhesive force of the pressure-sensitive adhesive coating of the bottom surface, measured in accordance with DIN 1939, in a range from 0.8 N to 5 N. More preferable is a range from 1.5 N to 3 N, and the most preferred is an adhesive force range from 2.0 N to 2.6 N.

For the adhesive force of the pressure-sensitive adhesive coating of the top surface, measured in accordance with DIN 1939, a range of from 30 N to 60 N is preferred.

In one preferred embodiment of the invention, the different pressure-sensitive adhesive coating and/or the different adhesive strength or adhesive force of the two surfaces is brought about by means of different adhesive application rates, the top surface with the greater adhesive strength having a higher adhesive application rate than the bottom surface.

Particular preference is given to an embodiment in which the adhesive application rate on the top surface is in the range from 100 g/m^2 to 250 g/m^2 and on the bottom surface is in the range from 5 g/m^2 to 40 g/m^2. For the bottom surface, a range from 8 g/m^2 to 20 g/m^2 is most preferred.

As already mentioned, different pressure-sensitive adhesives with different bond strengths may be used on each of the two surfaces, or the same pressure-sensitive adhesive may be used on each surface. The figures above relate to the case where the same pressure-sensitive adhesive is applied to the top and to the bottom surface.

The pressure-sensitive adhesive coating may be applied flatly, i.e., in a planar manner. However, a pressure-sensitive adhesive coating arranged substantially in the form of stripes on the surfaces, with adhesive-free spaces in between, is also possible. The combination of two-dimensional application and striped application on one of the surfaces, or the combination thereof on one of the surfaces, is likewise possible. The stated adhesive application rates relate in one of these cases only to the surface regions provided with a pressure-sensitive adhesive coating.

In another preferred embodiment of the invention, the textile structure, on at least the top surface of the backing layer of the self-adhesive sheet, comprises threads of suitable material of tensile strength, such as, in particular, cotton, plastic, or the like, in a wide-meshed arrangement.

The arrangement may adopt any substantially wide-meshed design. Particular preference is given to threads arranged at right angles to one another and lying parallel in the respective direction. The threads may be aligned in the respective directions parallel to the side edges of the self-adhesive sheet, or else may form any desired angle thereto.

Particular preference is given to an embodiment in which the textile structure has threads running parallel and also threads arranged rhomboidally thereto at an obtuse angle.

With particular preference, the respective thread spacing of the textile structure is between 3 mm and 30 mm.

The textile structure may comprise a fiber web or else a reticularly spun structure in which the threads consist of fine single filaments spun together with one another. The threads of the textile structure are located on at least the top surface of the backing layer and are embedded in, and substantially surrounded by, the pressure-sensitive adhesive layer so that the corresponding surface of the self-adhesive sheet as well is planar or substantially planar in design.

The wide-meshed textile structure ensures the dimensional stability of the self-adhesive sheet, with the planar or substantially planar design of the corresponding surface also remaining substantially maintained. This facilitates the reliable detachment of the floor covering from the floor because during detachment, the self-adhesive sheet adheres to the floor covering securely and with dimensional stability.

By virtue of the particularly preferred parallel and also rhomboidal arrangement of the threads, an additional dimensional stability is produced in the oblique direction, i.e., in the direction of the rhomboidally arranged threads. This additional stability is particularly advantageous when the floor covering is removed obliquely (in relation to the threads arranged parallel to the edges) and offers additional reliability for the residueless detachment from the floor.

In order to make it particularly easy to handle the self-adhesive sheet before and during laying and bonding of a floor covering to a floor, in a further preferred embodiment, the self-adhesive sheet has a removable cover film for covering the pressure-sensitive adhesive coating at least on the top surface.

It is also possible for there to be a removable cover film additionally, or only, on the bottom surface. In view of the substantially lower adhesive strength of the bottom surface, however, this is not absolutely necessary.

The cover film preferably comprises a conventional, silicone-treated release paper, which bears with virtually no gap against the corresponding surface, adhering but removable.

For the purpose of transportation, the self-adhesive sheet may be in roll form.

A self-adhesive sheet of the invention is used preferably as follows:

The entire floor is covered with the self-adhesive sheet. The bottom surface having the lesser or reduced adhesive strength is directed towards the floor. During this procedure, the top surface is preferably covered with the cover film. Then, the floor covering is laid on provisionally, and cut to size if necessary. Subsequently, part of the floor covering is folded back again and the cover film is removed on this part of the self-adhesive sheet. The folded-back part of the floor covering is folded down again onto the top surface having the greater adhesive strength, and is pressed on if necessary. The same procedure is followed with the remaining parts of the floor covering until the entire floor covering has been extensively bonded to the floor.

All that is required for the residueless detachment of the floor covering is to pull it up from the floor. During this operation, the self-adhesive sheet separates from the floor and remains adhering to the floor covering. If it is desired to reuse the floor covering with the self-adhesive sheet now already adhering to it, the bottom surface provided with pressure-sensitive adhesive coating can be protected with a suitable cover film as the floor covering is rolled up.

An alternative option to the above-described self-adhesive sheet of the invention with a textile structure, arranged at least on the top surface, for providing dimensional stability is a self-adhesive sheet of the invention without a textile structure.

For this purpose, however, a particularly suitable backing layer, possessing tensile strength and stretch resistance, is required in order to maintain the dimensional stability. Such a layer may comprise the materials already mentioned above for a backing layer, although the thicknesses selected must usually be greater than in the case of a self-adhesive sheet with an additional textile structure.

All of the above remarks, described embodiments, material, numerical and range data, and processes, with the exception of those points relating specifically to the textile structure, are also intended to apply to the self-adhesive sheet of the invention without a textile structure.